"[t]his exothermic transformation is deduced to be the transformation that changes the microstructure and atomic configuration from that of the as-coated coating 206 to that of the heat-treated coating 210." (Chen, col. 9, lines 55-59). Chen speaks of modifying the atomic structure of coating 206, not the shape of the interconnection of element.

According to the Patent Office, Chen discloses "reorganiz[ation of] the material to the new, desired form." (Final Office Action at page 7, citing Chen, Abstract, lines 10-14). However, Applicants' claim 1 recites modifying shape upon transformation. Applicants respectfully submit that "form" is not necessarily synonymous with "shape". Two items may have the same shape, but may have different forms. For example, an amorphous and a crystalline layer can have the same shape (e.g., a layer of material on a substrate), but their form (e.g., amorphous vs. crystalline) differs in various aspects. If the Patent Office persists in this rejection, Applicants respectfully request that the Patent Office specifically point out the manner in which Chen discloses modifying a shape of an interconnection element upon transformation.

At least for the reasons stated above, Chen does not contain all of the limitations of claim 1, and, therefore, does not anticipate claim 1. Claims 2-6 depend from claim 1 and therefore contain all the limitations of that claim. For at least the reasons stated with respect to claim 1, claims 2-6 are not anticipated by Chen. Applicants respectfully request that the Patent Office withdraw the rejection to claims 1-6 under 35 U.S.C. §102(e).

B. 35 U.S.C. §102(b): Rejection of Claims 1-6, 8-11, 14-15, 18-28, 30-32, 35, 38-44, 48-51, 55-59, 61-63, 66 & 69-79

The Patent Office rejects claims 1-6, 8-11, 14-15, 18-28, 30-32, 35, 38-44, 48-51, 55-59, 61-63, 66 and 69-79 under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 5,613,861 issued to Smith et al. (Smith).

As in their previous response, Applicants again submit that claim 1 is not anticipated by Smith, because Smith does not disclose an interconnection element comprising a first element material and a second element material, wherein one of the first element material and the second element material comprises a material having a transformable property such that, upon transformation, a shape of the interconnection element is modified. Smith describes a material having a stress gradient in the multiple sub-layers of the material. The stress gradient is responsible for the form of the spring contact.

In the Final Office Action, at page 7, the Patent Office acknowledges that "[t]he stress gradient [of Smith] is not a property of a material, it is a external factor causing the shape or the modification." The Patent Office reasons that the material in Smith has a transformable property because it "may change shape", even though the changing of shape is caused by the introduction of a stress gradient. (Final Office Action, at page 7). Applicants respectfully disagree with the

reasoning of the Patent Office. In general, most any item can change shape or crack if an external physical stress, such as a stress gradient or other physical force, is applied. This phenomenon is not a basis, however, to establish that all such items have a "transformable property". The transformable property of the material in an embodiment of Applicants' invention (e.g., the embodiment set forth in claim 1) is not primarily introduced by an external stress, such as physically bending the element.

Moreover, Smith fails to teach how to introduce a stress gradient. Smith merely states that "When the spring contact 15 is formed, the metal layer comprising the spring contact 15 is deposited such that compressive stress is present in upper portions of the metal layer and tensile stress is present in lower portions of the metal layer." (Smith, col. 5, lines 11-15). Applicants recognize that references are presumed to be operable. (See MPEP § 2121) However, it is well established that a prior art reference in a 35 U.S.C. § 102 rejection must contain an enabling disclosure to be operative. (See MPEP § 2121.01) Applicants are unable to find any disclosure in Smith that would enable one skilled in the art to introduce an "inherent" stress gradient in a material. Furthermore, Applicants submit that Smith's stress gradient cannot be "inherent", as claimed in line 5 of the Smith Abstract, if it must be "introduced into the flat metal strip". (Smith, col. 5, lines 8-9). As such, Applicants submit that Smith is not an operative reference, and therefore cannot anticipate claim 1.

For at least the reasons stated above in respect of claim 1, independent claims 22, 48 and 76 are also not anticipated Smith. Dependent claims 2-5, 8-11, 14-15, 18-21, 23-28, 30-32, 35, 38-44, 49-51, 55-59, 61-63, 66, 69-75 and 77-79 each depend from their respective base claims, and therefore contain all the limitations of such claims. Accordingly, Applicants respectfully request that the Patent Office withdraw the rejection to claims 1-6, 8-11, 14-15, 18-28, 30-32, 35, 38-44, 48-51, 55-59, 61-63, 66, and 69-79 under 35 U.S.C. §102(b).

C. 35 U.S.C. §103(a): Rejection of Claims 7, 12-13, 16-17, 29, 33-34, 36-37, 45, 47, 52-54, 60, 64-65, 67-68 and 80-82

The Patent Office rejects claims 7, 12-13, 16-17, 29, 33-34, 36-37, 45, 47, 52-54, 60, 64-65, 67-68 and 80-82 under 35 U.S.C. §103(a) as obvious over Smith in view of various different references or in view of ordinary skill in the art. According to the Patent Office, it would have been obvious to combine Smith with such references to invent the claimed subject matter, and it would have been obvious to one skilled in the art to, relying on Smith, discover the quantitative characteristics relating to the claimed transformability volume and percent of spring material in the interconnection element.

Claim 7 depends from claim 1 and therefore contains all the limitations of that claim. Claim 7 is prima facie not obvious over Smith, because Smith fails to describe an interconnection element

including a first element material and a second element material, at least one of which comprises a material having a transformable property such that, upon transformation, the shape of the interconnection element is modified. Further, there is no motivation from Smith to incorporate a material having a transformable property into a spring contact as Smith accomplishes its bending through the use of a stress gradient, not material transformation.

As discussed in the pending application at pages 5-6, in order to achieve the desired shape of the body, Smith must limit the thickness of the interconnection element described therein. A limit on the thickness of the interconnection element limits the spring constant, k, of the interconnection element (k increases as thickness increases) particularly in state-of-the-art interconnection element arrays where the dimensions (e.g., length and width) of individual interconnection arrays are reduced to accommodate a corresponding increase in contact pad or terminal density. A reduction of the spring constant generally reduces the amount of load or force, F, that may be applied to resilient interconnection elements for a given deflection, x ($k=F/x$). Thus, such interconnection elements as those described in Smith generally sustain at best a moderate contact force, which may not be enough to effect reliable pressure contact to an electronic component. Therefore, in order to solve the problem of improving the resiliency of interconnection elements, particularly interconnection elements suitable for present fine-pitch electrical connections and that are scalable to future technologies, one skilled in the art would not be motivated to consider the teachings of Smith, due to the aforementioned shortcomings of Smith.

At least for the foregoing reasons, Applicants respectfully submit that claim 7 is not obvious. Similar to claims 1 and 7, independent claims 22, 48 and 76 are not anticipated or rendered obvious by Smith, because Smith relies upon a material having a stress gradient rather than a transformable property. Accordingly, dependent claims 12-13, 16-17, 29, 33-34, 36-37, 45, 47, 52-54, 60, 64-65, 67-68 and 80-82, which depend from their respective base claims and therefore contain all of the limitations of their respective base claims, cannot be rendered obvious by Smith, at least for the reasons mentioned above in regard to Claim 7.

For the above stated reasons, Applicants respectfully request that the Patent Office withdraw the rejection to claims 7, 12-13, 16-17, 29, 33-34, 36-37, 45, 47, 52-54, 60, 64-65, 67-68 and 80-82
under 35 U.S.C. §103(a).

CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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Dated: December 13, 2001

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CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Box After Final, Assistant Commissioner for Patents, Washington, D.C. 20231, on December 13, 2001.

Marilyn Bass December 13, 2001